ON THE SNAKES OF THE GENUS CHARINA.

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Within the faunal area of North America, as it is usually understood, only two genera of boid snakes are known to occur, viz, *Charina* and *Lichanura*, which have been referred by Professor Cope to two distinct families, the former to the *Charinidæ*, the latter to the *Boidæ* proper. The osteological characters which separate these families are as follows:

Charinidæ: Coronoid bone and postorbitals absent.

Boidæ: Coronoid bone and postorbitals present.

Externally the two genera representing these families in our fauna may be distinguished as follows:

a^1. Frontal plate present, large ..... *Charina.*

a^2. Frontal plate absent ..... *Lichanura.*

The genus *Charina* was instituted by J. E. Gray, in 1849, for a California specimen in the British Museum, which he regarded as *Tortrix bottæ* of Blainville. Three years later Baird and Girard, in describing the reptiles brought home by the famous "United States Exploring Expedition" from our western coast, established the genus *Wenona* for two specimens which they regarded as types of two different species, viz, *W. plumbea* and *W. isabella*. These were afterwards described in greater detail and figured by Girard in the herpetological part of the exploring expedition (pl. vii). Finally, Jan, in 1862, after examining the type and only known specimen of Blainville's *T. bottæ*, expressed the opinion that the specimen so called and described by Gray represented another species and genus, for which reason he named the genus represented by Blainville's species *Pseudoeryx*. In spite of this statement by so high an authority, subsequent writers, who consider *T. bottæ* and *W. plumbea* generically distinct, have continued to call the former *Charina bottæ*. Noteworthy among these is Bocourt, who very forcibly points out the characters of the alleged two genera, though it is plain that Gray's *Charina bottæ*, if tested by Bocourt's own characters, is referable to *W. plumbea* rather than to the true *T. bottæ*.

As to the value of the species described, opinions have varied greatly. Cooper and Suckley (in the P. R. R. Rep., XII, iii, p. 303 (1860), expressed doubt as to the distinctness of *W. plumbea* and *isabella*, the latter stating expressly that "specimens appear to unite the characters of both species." The following year Cope (Proc. Phila. Acad., 1861, p. 305) also expressed as his opinion that both species are probably identical, and since then their identity seems to have been accepted

without further questioning. On the same occasion Cope even went so far as to doubt the specific distinctness of *W. plumbea* and *T. bottæ*, or as they were then for the first time called, *Charina plumbea* and *Ch. bottæ*. Later on he seems to have reversed his opinion and recognized their distinctness, as in his Check-list of North American Batrachia and Reptilia (1875), page 43, he enumerates both, assigning to *Ch. bottæ* as habitat the "Lower Californian region," while *Ch. plumbea* is stated to inhabit the "Pacific region." Whether the omission of *Ch. plumbea*, which he himself has stated to occur in Guaymas, Sonora, (Proc. Phil. Acad., 1861, p. 305), in his Catalogue of Batrachia and Reptilia of Central America and Mexico (1887), page 64, is due to his considering the two species identical is not clear, since *Ch. plumbea* is not mentioned in the synonymy of *Ch. bottæ*. However, in describing *Ch. brachyops* (Pr. U. S. Nat. Mus., XI, 1888, p. 88), he considers them specifically identical with but little doubt. Garman has been equally uncertain as to the status of these forms. At first (Rept. Batr. N. Am., I, Ophid., p. 7) he included both under the name of *Charina bottæ*, the diagnosis of which is evidently made up from descriptions of both, but in the appendix (p. 131) he admits a *Ch. bottæ* var. *plumbea*, the typical form with locality "California to Mexico," the variety ranging through "California to Puget Sound." Still later (List N. Am. Rept. and Batr., 1884, pp. 21, 22), he enumerates them as distinct species. As such they are also treated in Yarrow's Check List of North American Reptilia and Batrachia (1882), page 19. Only one specimen of *Ch. bottæ* seems to have been collected up to the present day, viz, the type which is preserved in the Paris Museum. Besides the original description and figures by Blainville, it has been described both by Jan and by Bocourt and figured by the former. The latter sums up the essential differences which distinguish *Wenona plumbea* from *Charina bottæ*, as he calls them, in the following manner:

(1) Nasals more developed and meeting on the top of the muzzle, thus taking the place of the internasals; (2) five prefrontals instead of only four; (3) eye separated from the supralabials by two suboculars; (4) scales of body somewhat smaller, forming forty-five longitudinal rows instead of thirty-nine only.

These characters are evidently drawn up from two specimens only, the type of *Ch. bottæ* and the specimen of *Ch. plumbea* which the Paris Museum received from the Smithsonian Institution, without regard to the variations of the latter shown in the descriptions and figures previously published. Having nineteen specimens in fair condition before me, I am able to throw some light on the individual variation of these snakes and to make some remarks which may not be without interest. Before discussing the differences between *Ch. bottæ* and *plumbea* it may be well to investigate those of *Ch. plumbea* and *isabella*. As exhibited by the type specimens the characters separating *isabella* from *plumbea* were thought to be as follows: (1), two large prefrontals with an additional small scale wedged in between them posteriorly, instead of four well developed ones; (2) no suborbitals, fourth and fifth labial being

in contact with the eye against two suborbital, and no labials in contact with eye.

From the table which I present below it will be seen that in the whole series no two specimens are alike as far as the plates of the head are concerned. There is hardly an individual with both halves of the head alike, the differences between them in some cases being so great that one side of the head would belong to one genus, the other to another, were we to accept the generic distinctions between *Charina* and *Wenona*, as set forth by Bocourt. Out of twenty specimens, six have four prefrontal plates like the types of *plumbea* (and *bottæ*), while eleven (including Bocourt's specimens) have five such plates, one has seven, one (*isabella* type) three, and one two. These facts seem to dispose of the first distinction between *plumbea* and *isabella*, as well as of the second between *plumbea* and *bottæ*. As to the upper labials being in contact with the eye, or this organ being surrounded by a ring of small scales, I may state that in the type of *plumbea* and eight more specimens the latter condition prevails, while in *isabella* and ten other specimens some of the labials come in contact with the eye. How valueless this character is, however, may be understood from the fact that in one specimen three labials on both sides are in contact; in another two on one side and three on the other; in five including the type, two labials touch the eye on both sides, and in two only one labial on each side, while, more conclusive still, one specimen, so far as labials are concerned, is typical *Ch. plumbea* on one side and equally typical *Ch. isabella* on the other; No. 4497 *b* is about similarly situated, though in this only one labial is in contact on one side, and none on the other. This breaks down very effectually the second barrier between *isabella* and *plumbea* as well as the third between *plumbea* and *bottæ*.

From the above I think it is safe to conclude that *Ch. isabella* is only an individual variation of *Ch. plumbea*.

Two of the distinctions between the latter and *Ch. bottæ*, as tabulated by Bocourt, have already been shown to be due to individual variation. A glance at our table will demonstrate that the first character assigned to *bottæ* as peculiar, viz, the presence of internasals, is shared by No. 12581, which is otherwise a tolerably average *plumbea*, and the numerous indications of the anterior nasal breaking up into a prenasal proper and an internasal, as shown, for instance, on the right side of the type of *plumbea*, proves conclusively to my mind that this character is entirely unreliable.

There remains now the number of scale rows of the body, which in the type of *bottæ* are said to be 39. In this particular we have no connecting link as yet between the two species. The commonest number of scale rows in *plumbea* are 45, though several specimens have 43, and a few 47 to 49. Whether this gap will be filled up remains to be seen, but until this happens *Ch. bottæ* seems entitled to recognition upon this character alone.

The specimen with 49 scale rows (No. 4497 *b*) is in many respects a remarkable one, and I have been very much tempted to describe it as a distinct species, for not only is the number of its scale rows excessively large, but the relation between rostral and anterior nostrals is entirely unique, inasmuch as the former entirely separates the two latter, being in contact with the prefrontals, thus destroying what has been considered even a good generic character of *Charina*. This specimen also has the lowest number of urosteges, but taking into account the enormous variability which has been demonstrated above, I think there can be no doubt but that this specimen only represents an extreme individual variation.

Since the above was set in type, five more specimens have come to hand. They are collected by Prof. O. B. Johnson, at Seattle, Wash., and are in many respects very interesting. In the first place, three of them are very large, showing that all the rest of the specimens examined are young ones; in the second place, they bear out the conclusions based on the previous material as given above, and demonstrating still further the enormous individual variation of the cephatic plates, in one specimen the frontal even being divided longitudinally. On the other hand, they establish more firmly 43 scale rows as the minimum of *Ch. plumbea*. They have been included in the table given below.

Quite recently Professor Cope, in these Proceedings (Vol. XI, 1888, p. 88, pl. xxxvi, fig. 2), has described *Ch. brachyops* as a new species with the following diagnosis: "Prenasal separated from internasal; postnasal joining preocular, no loreal; prefrontal entering orbit; one superciliary; superior labials 8 to 9."

As to the labials, 9 seems to be the usual number; sometimes as many as 11 are found, and exceptionally only 8, so that the character derived from them is not diagnostic. Neither is the first character assigned to the new species peculiar to it, for we have seen that it is one of the features ascribed to the type of *Ch. bottæ*, and it is also found in our No. 12581. One superciliary is the commonest number in *Ch. plumbea*, and is also found in *Ch. bottæ*. Even the absence of a loreal is not very unusual in *Ch. plumbea*, in the type specimen of which it is wanting on both sides, while in the type of *Ch. isabella* it is only absent on one side, but in those cases which have come under my observation the loreal has disappeared by being fused with one of the prefrontals, which are thus interposed between the posterior nasal and the anteorbital, while in the type of *Ch. brachyops* the loreal seems to be absorbed by the anteorbital, thus bringing the latter into direct contact with the posterior nasal. The last diagnostic mark of the new species is "prefrontal entering orbit." There is no approach to this character in any other of the *Charinae* before me, though it is doubtful if it is of more value than the "labials entering the orbit" in differentiating *Ch. bottæ* or *isabella*. In addition to these characters the muzzle seems rather depressed as well as narrow, and the eye seems to be somewhat larger than in *Ch. plumbea*, but too great stress can not be laid on these charac-

ters, as the type specimen has dried somewhat out of shape from having been placed in too strong alcohol. The figures accompanying the original description are extremely poor, that representing the top of the head (fig. 2 *a*) being particularly inaccurate, inasmuch as the rostral and superciliary are drawn nearly twice their comparative size.

On the whole, the status of the new species is about the same as that of *Ch. bottæ*. They should be recognized until conclusively proven to be only individual variations of the same species.

With this proviso, therefore, we distinguish at present three species, as follows:

a^1 39 scale rows ..... *Charina bottæ.*

a^2 43 scale rows, or more.

b^1 Posterior nasal not in contact with anteorbital; prefrontal not entering orbit ..... *Charina plumbea.*

b^2 Posterior nasal in contact with anteorbital; prefrontal entering orbit. *Charina brachyops.*

The synonymy of the genus and the supposed three species would stand thus:

Charina GRAY.

1849.—*Charina* J. E. GRAY, Cat. Snakes Brit. Mus., p. 113 (type *Ch. bottæ* GRAY = *Ch. plumbea?*).

1852.—*Wenona* BAIRD and GIRARD, Proc. Philada. Acad., 1852, p. 176 (type *W. plumbea*).

1862.—*Pseudoeryx* JAN, Arch. f. Naturg., XXVIII, i, p. 242 (type *Tortrix bottæ* BLAINV.).

1862.—*Wenonia* JAN, Arch. f. Naturg., XXVIII, i, p. 242 (emend.).

Charina bottæ (BLAINV.).

1835.—*Tortrix bottæ* BLAINVILLE, Nouv. Ann. Mus. d'Hist. Nat., IV, p. 289, pl. 26, figs. 1, 1*a*, 1*b*.—*Pseudoeryx bottæ* JAN, Arch. f. Naturg., XXVIII, i, 1862, p. 246.—JAN & SORDELLI, Iconogr. Oph., Texte, 2 livr., 1865, p. 67 (3 livr., pl. ii, fig. 1).—*Charina bottæ* BOCOURT, Miss. Scientif. Mexique, Zool., III, livr. 8, 1882, p. 511.—COPE, Cat. Batr. Rept. C. Am. Mex., 1887, p. 64.—GARMAN, N. Am. Rept., Ophid., 1883, p. 7 (part only).

Charina plumbea (B. & G.).

1849.—*? Charina bottæ* J. E. GRAY, Cat. Spec. Snakes Brit. Mus., p. 113 (*nec* BLAINV.).

1852.—*Wenona plumbea* BAIRD & GIRARD, Proc. Philada. Acad., 1852, p. 176.—*Iid.*, Cat. N. Am. Rept., I, Serp., 1853, p. 139.—GIRARD, U. S. Expl. Exp., Herpetol., 1858, p. 112, Atlas, pl. vii, figs. 1–7.—COOPER, Rep. Expl. Surv. P. R. R., XII, iii, 1860, p. 303.—JAN, Arch. f. Naturg., XXVIII, i, 1862, p. 247.—JAN & SORDELLI, Iconogr. Oph., Texte, 2 livr., 1865, p. 69 (3 livr., pl. ii, fig. 2).—BOCOURT, Miss. Scientif. Mexique, Zool., III, livr. 8, 1882, p. 512, pl. xxx, figs. 7-7*c*.—*Charina plumbea* COPE, Proc. Philada. Acad., 1861, p. 305.—*Id, ibid.*, 1883, pp. 21, 23.—YARROW, Check List N. Am. Rept. Batr., 1883, p. 142.—TOWNSEND, Proc. U. S. Nat. Mus., X, 1887, p. 240.

1852.—*Wenona isabella* BAIRD & GIRARD, Proc. Philada. Acad., 1852, p. 176.—*Iid.*, Cat. N. Am. Rept., I, Serp., 1853, p. 140.—GIRARD, U. S. Expl. Exp., Herpetol., 1858, p. 113, Atlas, pl. vii, figs. 8–14.

1883.—*Charina bottæ* var. *plumbea* GARMAN, N. Am. Rept., Ophid., 1883, p. 131.

Charina brachyops COPE.

1888.—*Charina brachyops* COPE, Proc. U. S. Nat. Mus., XI, 1888, p. 88, pl. xxxvi, figs. 2*a–f*.

Species.	Museum and No.	Collector.	Locality.	Scale rows.	Gastrosteges.	Urosteges.	Loreals.	Prefrontals.	Internasals.	Anteorbitals.	Supraorbitals.	Postorbitals.	Suborbitals.	Labials in contact with eye.	Remarks.
Ch. bottæ	Paris	Botta	"California"	39	202	30	1	4	2	1	1	3	0	3	Type spec. Jan & Bocourt auctt.
?...?	Brit. Mus.	?	"California"			--	2	4	0	3	3	3	+	0	Type of *Charina*. J. E. Gray auct.
Ch. plumbea	Paris	?	"Utah Terr."	43–45	192	30	1	5	0	2	1	3	2	0	Received from the Smiths. Inst.
Do	U. S. 4492	Expl. Exp	Puget Sound	45	206	37	0	4	0	1	1	3	2	0	Type of *W. plumbea*.
Do	U. S. 8922	Hemphill	Oakland, Cal	45	209	33	1–2	7	0	1	3	2	2–3	0	
Do	U. S. 9255	Kennerly	?	45	206	39	2	5	0	1	2	2	2	0	
Do	U. S. 11691	Ridgway	Nevada	45	208	36	1	5	0	1	1–2	2	2	0	
Do	U. S. 4499	Newberry	Oregon	45	201	37	1	5	0	1	1	3	2	0	
Do	U. S. 4497*b*	Trowbridge	Presidio, Cal	49	209	29	1	5	0	1	1	3	2–1	0–1	Ant. nas. do not meet.
Do	U. S. 4494	Suckley	Ft. Steilacoom, Wash	47–48	206	38	1–0	4	0	1–2	1	3	3–2	0–2	
Do	U. S. 4497*a*	Trowbridge	Presidio, Cal	45	195	34	1	4	0	1–2	1	2	1–2	1	
Do	U. S. 9563	Henshaw	Eagle Lake, Cal	43	206	35	1	5	0	2	1	3	1	2	An. nas. and ant. pref. fused.
Do	U. S. 12581	Bendire	John Day Valley, Oregon	45	208	33	1	5	2	1	1	3–2	1	2	
Do	U. S. 11789	Eisen	Fresno, Cal	45	211	36	1	5	0	1	1	4	0	3	
Do	U. S. 12556	do	do	43	204	34	1	4	0	1	1	3	0	2–3	
Do	U. S. 7299	Expl. Exp	Puget Sound	45	210	34	1–0	3	0	1	1	3	0	2	Type of *W. isabella*. Ant. and post. prefrontals fused.
Do	U. S. 16148	Johnson	Seattle, Wash	43	206	31	1	5	0	1	3	2	3	0	A few urosteges divided; frontal divided longitudinally.
Do	U. S. 16149	do	do	43	200	36	1	4	0	1	1	3	2	0	A few urosteges divided; ant. nas. and ant. prefront. fused.
Do	U. S. 16150	do	do	43	203	35	1	4	0	1–2	1	2–3	2	0	Ant. nas. and ant. pref. fused.
Do	U. S. 16151	do	do	45	201	37	1	5	0	2	1	1–3	1–2	1	
Do	U. S. 16152	do	do	43	203	35	1	5	0	1–2	1	3	1–0	2	
Do	U. S. 4496	Trowbridge	Humboldt Bay, Cal	45	206	34	1	5	0	1	1	4–2	1	2	Ant. nas. and ant. pref. fused.
Ch. brachyops	U. S. 15524	Merriam	Cape Reyes, Cal	45		--	0	4	2	1	1	3	0	3–4	Type.